Selective Attention in Auditory and Visual Stroop Tasks in Children with Specific Language Impairment

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Why Study Attention

• Selective attention is the ability to focus on a specific feature, stimulus, or stimulus stream while ignoring other, potentially distracting or irrelevant stimuli
• Several factors (perceptual, working memory, and linguistic deficits) exhibited by children with SLI may be the result of attentional deficits.
• Preschool children with SLI perform more poorly on sustained auditory attention tasks compared to age matched controls (Spaulding, Plante, & Vance, 2008).
• Selective attention skills are correlated with cognitive abilities (Johnson, Im-Bolter, & Pascual-Leone, 2003).
• Using a dichotic listening task Niemi, Gunderson, Leppasaari, & Hudahl (2003) concluded that individuals with SLI have an attention deficit related to left hemisphere function.
• Despite the apparent role of attention in speech and language development, there are limited studies specifically investigating selective attention in children with SLI and none using Stroop tasks.

Specific Aims

• To determine whether children with SLI have deficits in selective attention as measured by Stroop tasks and whether these deficits are modality specific.

Methods

Subjects

• 22 children (12 TLD and 10 SLI).
• Children ranged in age from 8-10 years
• All subjects had normal hearing and no known cognitive deficits. Mean IQ for the TLD group was 109 (TONI). Mean IQ for the SLI group was 104 (TONI)
• SLI Criteria: overall receptive and expressive language deficits. Mean language scaled score for SLI group was 7 (CELF-4). Mean language scaled score for TLD group was 11.8 (CELF-4).

Experimental Task

Auditory and Visual Stroop (1935) Task

Types of Trials

• Congruence
  1. Congruent—facilitation
  2. Incongruent—interference
  3. Neutral
• Modality
  1. Auditory
  2. Visual
• Attend Condition
  1. Linguistic—Respond to linguistic attribute, ignore perceptual.
  2. Perceptual—Respond to perceptual attribute, ignore linguistic.

Results/Discussion

Data were analyzed for reaction time (RT) and accuracy using a mixed model ANOVA with repeated measures. Only correct responses were included in the analyses.

• There was a main effect for Stroop Interference across modality and condition. Children with and without SLI demonstrated slower RTs when stimuli were incongruent. F(2, 40) = 37.28, p < .0001
• There was a between subject effect for classification. The SLI group performed significantly slower than the TLD group for all conditions and modalities F (1, 20) = 3.816, p=0.06
• There was no main effect for condition and congruence between the SLI and TLD group F2, 40) = 2.16, p=.129
• There was a significant difference between the SLI and TLD group according to modality (auditory vs visual) and congruence. Children with SLI performed slower than the TLD group in the auditory modality. F2, 20 ) = 3.39, p =. 043
• There was a significant difference for accuracy between the SLI and TLD group. Accuracy was calculated for the incongruent condition as the number correct divided by the total number of trials. The SLI group were less accurate (86.1%) than the TLD group (92.3%). F2, 90) = 7.5, p< 0.05

Conclusions

1. Children with SLI performed in a similar, but slower, fashion to age-matched typically developing peers. Both groups exhibited Stroop interference regardless of modality or condition.
2. Children with SLI exhibited increased reaction times compared to age matched typically developing peers in the auditory modality suggesting modality specific deficits.
3. Children with SLI exhibited more errors during incongruent trials, indicating deficits in inhibition.
4. Further research should include the recruitment of more subjects to increase statistical power.
5. Further analysis is warranted to determine facilitation effects for all conditions and modalities.

References


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